

Evaluate new chemical controls to be incorporated into Integrated Pest Management of fire blight

**Deborah Breth, IPM Area Extension Educator, Lake Ontario Fruit Program,
Cornell Cooperative Extension**

There are many copper formulations registered for fire blight control at various timings in NYS. Copper is historically used to reduce the amount of bacteria available for blossom infection by intercepting and killing some of the bacteria oozing from the overwintering cankers. But copper also has a reputation for russetting fruit finish if applied too close to bloom time. Timing the copper application closer to dormant so there is little residue available when fruitlets are susceptible to fruit finish damage can minimize fruit russet. But this may be too early since fire blight cankers do not become active and produce bacterial ooze until closer to bloom.

Cuprofix Disperss is a recently registered material in NYS with fire blight control on the label between silver tip and green tip at 10-20 lb./acre. This study was conducted to evaluate fire blight control if 2 applications of Cuprofix Disperss between silver tip and green tip provided improved control and improved fruit finish compared to other grower practices. Since blossom blight is the primary mode of fire blight epidemics and not completely controlled by copper treatments applied prebloom, streptomycin continues to be a critical control method for minimizing fire blight infections in orchards.

Procedures:

Conducted demonstration plots on 2 farms, dividing orchard blocks into 2 treatments, the Cuprofix treatment and the grower standard. The Cuprofix treatment included 2 applications of Cuprofix Disperss at 10 lb./acre in 100 GPA by green tip. The grower standard treatments varied for each farm. Streptomycin was recommended for the entire block when “high” risk of or blossom blight “infection” was predicted by Maryblyt and Cougarblight models.

Partyka application dates:

Cuprofix Plot –

Cuprofix Disperss @10 lb/acre applied April 9, 17

BacMaster @ .75 lb./acre + Regulaid @ .75 pt./a applied May 11, 14

Grower Std. –

Kocide @ 8 lb./acre applied April 17

BacMaster @ .75 lb./acre + Regulaid @ .75 pt./a applied May 11, 14

DeBadts application dates:

Cuprofix Plot –

Cuprofix Disperss @ 10 lb./acre applied April 9, 15

BacMaster @ 1.5 lb./acre applied on May 7, 10-13.

Grower Std. –

Champ 2F @2/3 pt/acre applied April 14, 20

BacMaster @ 1.5 lb./acre applied on May 7, 10-13.

Bud Development at application dates were as follows: April 9 – ST, April 15 –ST, April 17 –GT-QIG, April 20 – Idared @ HIG, May 6– First bloom, May 10 – Full bloom, May 17 - <5% bloom.

(ST = silver tip, GT = green tip, QIG = quarter inch green, HIG = half inch green)

For evaluation of control, 20 trees were examined per treatment for blossom blight strikes per 100 clusters, and number of canker blight and shoot blight strikes per tree. Data was analyzed using ANOVA, $p \leq .05$.

To evaluate phytotoxicity, 50 fruit were examined from each of 5 trees in each plot for russet on skin using a grading scale of 0-4 based on percentage of fruit surface with russet, and 0-3 for amount of stem bowl russet. Each apple was evaluated based on a range of russet as follows:

0 = 0-3% of skin with russet or rough skin

1 = 4-20% of the skin with russet or rough skin

2 = 21-45% of skin surface with russet

3 = 46-74% of skin surface with russet

4 = > 75% of skin surface with russet

The level of stem end russet was also recorded within the following description:

0 = no stem end russet

1 = stem end russet only in stem bowl

2 = stem end russet starting to expand up over the shoulder around stem bowl

3 = stem end russet extending over shoulder around entire stem bowl

Stem end or whole fruit russet was calculated as: $[(\text{rating} \times \text{the number of fruit with the rating}) / (\text{highest rating} \times \text{total number of fruit})] \times 100$. (Burr, 2002)

Results:

Table 1 shows a statistical difference in the amount of canker blight between farms. There was more overwintering potential at Partyka's than DeBadts'. And plot evaluation showed there was significantly more overwintering inoculum as recorded by canker blight strikes in the grower standard plot at Partyka's. Canker blight is the collapse of blossoms and shoots on a branch due to girdling of the branch by an active canker from a previous season's fire blight infection.

The efficacy of a blossom blight control technique is primarily dependent on two factors, 1) amount of inoculum in orchard in the form of overwintering cankers, and 2) the timing of applications of streptomycin during bloom. In spite of the high pressure season, there was little or no blossom blight detected in trees sampled in test blocks. There were few shoot blight strikes noted in the Partyka orchard but no difference detected between treatments. There were no shoot blight strikes noted in the DeBadts' orchard.

The Maryblyt model predicted blossom blight infections at DeBadts' on May 11, 14, 15, 17 and 18 (using weather data from a Weather Tracker sensor nearby) if no strep

applications were made; and at Partyka's, May 11, 14, 15, using weather data from NEWA Waterport. With streptomycin sprays included in Maryblyt model, blossom blight control was excellent in both locations; sprays were perfectly timed in Partyka's plots, and well timed during the full bloom period at DeBadts. The first spray at DeBadts' on May 7, in hind-sight was a conservative response to having high fire blight pressure in past seasons and rainfall after a day in the mid-70's. Maryblyt model reports for each site are included in Appendix.

There was no significant difference in number of blossom blight infections and shoot blight infections between Cuprofix plots and grower standards. If there was a significant difference in blossom blight and shoot blight, this could be related to the use of Cuprofix early.

| Table 1. Efficacy of early season copper treatments in control of canker blight, blossom blight, and shoot blight. | | | | |
|--|----------------------------|--------------------------------------|-------------------------------------|-------------------------------------|
| Orchard | Treatment | No. canker blight strikes per tree * | No. blossom blight per 100 clusters | No. shoot blight strikes per tree * |
| Partyka | Cuprofix @ 10 lb./acre X 2 | 0 a** | 0 a | 0.15 a |
| Partyka | Kocide @ 8 lb./acre X 1 | 0.25 b | 0.6 a | 0.65 a |
| DeBadts | Cuprofix @ 10 lb./acre X 2 | 0 a | 0 a | 0 a |
| DeBadts | Champ 2F @ 2/3 pt/acre X 2 | 0 a | 0 a | 0 a |
| * There is a significant difference between orchards. | | | | |
| ** Separation of means is reported between treatments in each orchards, numbers with the same letters are not significantly different according to LSD, $p \leq .05$. | | | | |

There was no difference in the amount of stem end russet in DeBadts, but the whole fruit russet was significantly greater in the grower standard than in the Cuprofix plot. There was no difference in fruit russet detected in the Partyka trial.

| Table 2. Whole fruit and stem end russet evaluation for copper treatments. | | | |
|--|----------------------------|----------------------------|-------------------------|
| Orchard | Treatment | Whole Fruit Russet Average | Stem End Russet Average |
| Partyka | Cuprofix @ 10 lb./acre X 2 | 13.2 a | 34.0 a |
| Partyka | Kocide @ 8 lb./acre X 1 | 14.3 a | 39.5 a |
| DeBadts | Cuprofix @ 10 lb./acre X 2 | 1.8 a | 28.8 a |

| | | | |
|--|-------------------------------|-------|--------|
| DeBadts | Champ 2F @ 2/3 pt/acre X 2 | 6.2 b | 29.9 a |
| ** Separation of means is reported between treatments in each orchards, numbers with the same letters are not significantly different according to LSD, $p \leq .05$. | | | |

Conclusions:

- ✓ No difference detected in fire blight control.
- ✓ No difference in fruit russet in Partyka trial, but significantly more fruit russet noted in grower standard treatment (Champ) in DeBadts' orchard.
- ✓ The 2 applications of copper by green tip may have an advantage in scab control preventing the need for a post-infection fungicide for a green tip scab infection if copper is applied before the scab infection period.

References:

Burr, T.J., 2002. Development of Integrated Pest Management Strategies for Apple Fruit Russet. 2001 NYS Fruit Project Reports Relating to IPM, NYS IPM Publication #219. pp 21-25.